Alaska Space Grant Program
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Alaska Space Grant Program is a Program Grant Consortium funded at a level of $590,000 for fiscal year 2009.

PROGRAM GOALS

Outcome 1: Contribute to the Development of the STEM Workforce (Employ and Educate)

Fellowship:/Scholarship Program:

Goal: Support workforce development by pumping the STEM "pipeline" through offering a sequence of competitive scholarship and fellowship opportunities to Alaskan students from diverse populations in STEM, and related education disciplines at Affiliate member institutions. Fellowship/scholarships will be provided equitably across the state with an emphasis on achieving and maintaining diversity in numbers of applicants and awardees.

Objectives

1. Recruit at least one applicant per year for an internship or summer program at a NASA center. By 2011 recruit at least one applicant per 4 yr affiliate institution per year.
2. By spring 2010 create a "Student Opportunities in Alaska" webpage to connect students to NASA "relevant" research projects and faculty. By 2011 opportunities will be identified at every 4 yr institution and updated every year.
3. Each year, at least one early career scholarship will be awarded at each affiliate institution to a freshman, sophomore or a student transitioning from a rural campus to a 4 yr degree program.
4. Every year, at least one fellowship will be awarded at each affiliate institution that has a 4 yr STEM degree program or to a rural student performing summer research at an affiliate 4 yr degree institution.
5. At least one additional fellowship/scholarship will be awarded to an appropriate minority applicant until we reach or exceed our stated minority goal.

Research Infrastructure Program:

Goal: Provide research initiation grants in strategic areas to improve collaboration between Alaska and NASA researchers and to improve the ability of Alaskan researchers to compete for NASA research and development work.

Objectives:

1. At each Affiliate institution identify and support expertise in areas of interest to NASA. By 2012 at least one strategic area of interest will be identified at every Affiliate institution with a 4 year STEM degree program.
2. Build capacity and expertise in the aerospace program at UAF to successfully respond to NSF and NASA solicitations for small satellite missions. By 2012 a small satellite proposal will be submitted.
3. Provide a venue for researchers across the state to meet and develop inter-institutional collaborations. The Alaska Space Grant first annual Space Grant Symposium will be held in May 2010. At least one collaborative research infrastructure project will be awarded by 2012.

Higher Education Program:

Goal: Provide support for interdisciplinary team activities and events that act to synthesis a student's degree program and connect students to NASA higher education programs. Provide support for curriculum development/modification for the inclusion of NASA relevant topics.

Objectives:

1. By 2012 create an "Alaska Space Grant Grand Challenge" competition with teams at each of our rural affiliate institutions to provide "authentic" research and/or engineering experiences on our minority serving campuses.
2. In 2010, Alaska Space Grant will host their first annual Space Grant Symposium where students may present their research projects. In 2010, 50% of all students receiving fellowship awards or participating in Alaska Space Grant supported higher education activities will present their work either at the Alaska Space Grant Symposium or at some other professional conference. By 2015 over 90% of these students will be presenting their work.
3. Promote NASA higher education programs at our affiliate institutions. At least one student or team will participate in a NASA higher education program every year.
4. Continue to support NASA relevant Higher Education programs at each Affiliate institution that contribute to the overall employment rate in STEM fields. 90% of all students participating in Higher Education programs will continue to graduate school, a career in STEM field, or pre-college teacher training.

Outcome 2: Attract and Retain Students in STEM Disciplines (Educate and Engage)

Precollege Program:

Goal: Provide support for Alaska pre-college STEM education with emphases on NASA content, teacher training, and delivery to underrepresented group.

Objectives:

1. Increase the STEM content knowledge of Alaska's pre-college teachers through teacher professional development. All ASGP sponsored professional development programs will show increased STEM content knowledge.
2. Support rural teacher professional development with summer programs and/or distance delivery programs. At least one professional development project/class targeting rural teachers will be supported each year.
3. Support standards based curriculum development in STEM fields connecting NASA relevant materials to the classroom. All curricula will be standards based and be freely available through the ASGP and/or our affiliate's website.

4. Provide limited support for student involvement activities to inspire interest in STEM fields and careers that specifically target underrepresented students. Each student involvement activity will show increased interest in pursuing STEM education and/or careers.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers (Engage and Inspire)

Informal Education Program

Goal: Provide support for professional development of informal education providers and informal education programs that use NASA themes and content and/or Alaska Native "ways of knowing" to enhance participant awareness and knowledge of NASA mission activities, STEM disciplines and career opportunities.

Objectives:

1. All ASGP sponsored informal education programs will show greater understanding of and/or interest in NASA mission activities, STEM disciplines and/or career opportunities in at least 50% of participants.
2. Connect informal education providers to NASA relevant research conducted in Alaska through the Alaska Space Grant Symposium to collaboratively develop Alaska/NASA specific informal education programs and professional development opportunities. Identify at least one new informal education activity each year.
3. Facilitate at least one annual training session to equip informal science educators with the knowledge and skills needed to deliver NASA aerospace content that will effectively engage large numbers of participants.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Outcome 1

- New Space Systems Engineering Program is an expansion of the historic Student Rocket Project. This year we presented a revised course, EE656/ME656 Space Systems Engineering (match funded through faculty time) to initiate a CubeSat mission at UAF. We subsequently proposed to the NASA CubeSat launch initiative and were one of twelve selected. We had 20 funded and unfunded engineering and science students participating in this project (FY09)
- Alaska Pacific University higher education project "Behavior of free-roaming Giant Pacific Octopuses using tracking and image analysis (Engaging students with technology through ocean research)" impacted 69 students and lead to 4 undergraduate student practicum and 4 senior projects; 3 graduate student thesis; 7 presentations at professional conferences each of which included student authors; and 2 submitted proposals, one of which was funded.
- Doubled our funded underrepresented minority students in our fellowship/scholarship program to 16.7% (FY09) from 8% (FY08). Supported 7 NASA student internships

Outcome 2

- Supported three precollege school councilors and two university faculty to attend NASA's Education Forums associated with the spring 2010 shuttle launches. All attendees returned to Alaska inspired and awed at the opportunity to see one of the remaining shuttle launches. For Robert McClory, of Ketchikan High School, the experience has already made a difference in the support he'll be able to provide students. "I've got two students graduating from Ketchikan High to go to UAF to study engineering, one in aerospace. (The Education Forum) made it a lot easier for me to understand and encourage their goals. It gave me some perspective and ideas and familiarized me with some of the NASA web resources."

Outcome 3

- Funded a one year project to collect Alaska Native oral histories about the night sky and incorporate them into a dynamic, culturally relevant planetarium presentation. As a side effect of this project the three museum and science center affiliates were encouraged to collaborate on a proposal to NASA's 2009 Competitive Program for Science Museums and Planetariums. Their proposal, "Climate Change: NASA's Eyes on the Arctic" was approved for funding! This proposal creates a *partnership* between the three museum and science center affiliates and scientists at the University of Alaska Fairbanks to develop permanent and traveling exhibits and programs that feature climate change data collected by NASA Earth-orbiting satellites.

PROGRAM ACCOMPLISHMENTS

Outcome 1: Contribute to the Development of the STEM Workforce (Employ and Educate)

Fellowship:/Scholarship Program: 42 total awards in FY09, at least one at each academic institution. 7 students were funded for NASA internships. Rate of awards to underrepresented minorities is 16.7% in FY09 double from the 8% in FY08.

Research Infrastructure: one funded research infrastructure award, first annual Space Grant Symposium was help in Juneau and was attended by researchers across the state. Proposed to NASA's CubeSat launch initiative and was one of twelve selected.

Higher Education: over 50% of students funded through Alaska Space Grant presented their projects either at professional meetings, the Alaska Space Grant Symposium, the UAF Undergraduate Research Symposium, student professional organization meetings, or other public open forums. APU, UAS, and UAF each conduct hands-on authentic research and/or engineering experiences that include NASA relevant topics through space grant funded higher education projects. Of the 22 longitudinally tracked students that took their "next step" during FY09, 50% are pursuing advanced STEM degrees, 27% are employed in STEM non-aerospace field, 9% are employed in K12 STEM academic field, 4.5 % are employed in "Other" STEM academic field, and 9% are still seeking employment.

Outcome 2: Attract and Retain Students in STEM Disciplines (Educate and Engage)

Precollege Program: Supported three K12 school councilors to participate in NASA's education forum associated with a shuttle launch, science curriculum development and implementation for home school community in Kenai, and the development of a new graduate level course in the School of Education (UAF) to support the Fairbanks North Star Borough revised science curriculum which now includes Earth and Space Science. Presented professional development to 89 6-12 math and science teachers from around Alaska.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers (Engage and Inspire)

Informal Education Program: Developed a collaborative partnership between our museum and science center affiliates and scientist at the University of Alaska Fairbanks which led to a collaborative proposal to NASA's 2009 Competitive Program for Science Museums and Planetariums.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Longitudinal Tracking:** Fellowship/Scholarship: total awards 42 (FY09) of which 36 are longitudinally tracked (6 awards were for one time scholarships). 21 are still in school, 9 are pursuing an advanced STEM degree, 1 is seeking STEM employment, 4 are employed in STEM (non-aerospace) field, 1 is employed in K12 STEM academic field, and 1 is employed

in "Other" STEM academic field. 16.7% of all fellowship/scholarship awards went to underrepresented minority students. 25 students participated (funded and unfunded) in higher education and/or research infrastructure projects. 19 of these students are still in school, 2 are pursuing an advanced STEM degree, 1 is seeking STEM employment, 2 are employed in STEM (non-aerospace) field, and 1 is employed in K12 academic field. 4% of longitudinally tracked participants in higher education and/or research infrastructure projects are underrepresented minority students. Across all longitudinally tracked students 13% are underrepresented minority students. 7 students participated in internships at NASA centers.

- **Course Development**: One new course, and two revised courses.
- **Matching Funds:** Matching funds of $440,000 will be obtained by the end of our no-cost period. All funds that have so far been distributed have been match 1:1. Actual cash match includes $120,000 from the lead institution, and $20,000 from Alaska Aerospace Corporation for fellowships in support of the Space Systems Engineering Program at UAF.
- **Minority-Serving Institutions:** None

IMPROVEMENTS MADE IN THE PAST YEAR

We now have a defined process for solicitation and evaluation (with feedback) for proposals across all funded categories. We have increased our collaborations with external organizations, most specifically: Arctic Amateur Radio Club (AARC), Aleut Global Solutions (AGS), and Alaska Aerospace Corporations (AAC). We place two summer intern in state one at AGS and one at AAC. The most significant result from these relationships is a $20,000 cash donation from AAC to Alaska Space Grant to support fellowships to students that participate in our Space Systems Engineering Program. We are working to improve Alaska Space Grant's visibility in the state and published our first annual Alaska Space Grant newsletter last winter.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

- **University of Alaska Fairbanks** – Lead institution, research center for the statewide university system, and only PhD granting institution in the state of Alaska. Participates in fellowship/scholarship, research infrastructure, higher education, and precollege programs.
- **University of Alaska Anchorage** – Urban 4-year university serving the population center of Alaska. Currently participates in fellowship/scholarship programs.
- **University of Alaska Southeast** – Regional 4-year university serving southeast Alaska. Participates in fellowship/scholarship, higher education, and precollege programs
- **Alaska Pacific University** – Private 4-year university focusing on inquiry based learning in environmental sciences. Participates in fellowship/scholarship and higher education projects.
- **Challenger Learning Center of Alaska** – non-profit corporation focusing on hands-on precollege science programs.
- **Anchorage Museum** – new affiliate after merger with Imaginarium (previous affiliate). Focuses on hands-on exhibits and inquirey-based programs in Space and Earth Science and Aerospace technology.
- **Museum of the North** – only research and teaching museum in Alaska. Focuses mostly on informal education projects and supporting dissemination to the general public of NASA related research projects currently conducted at UAF.